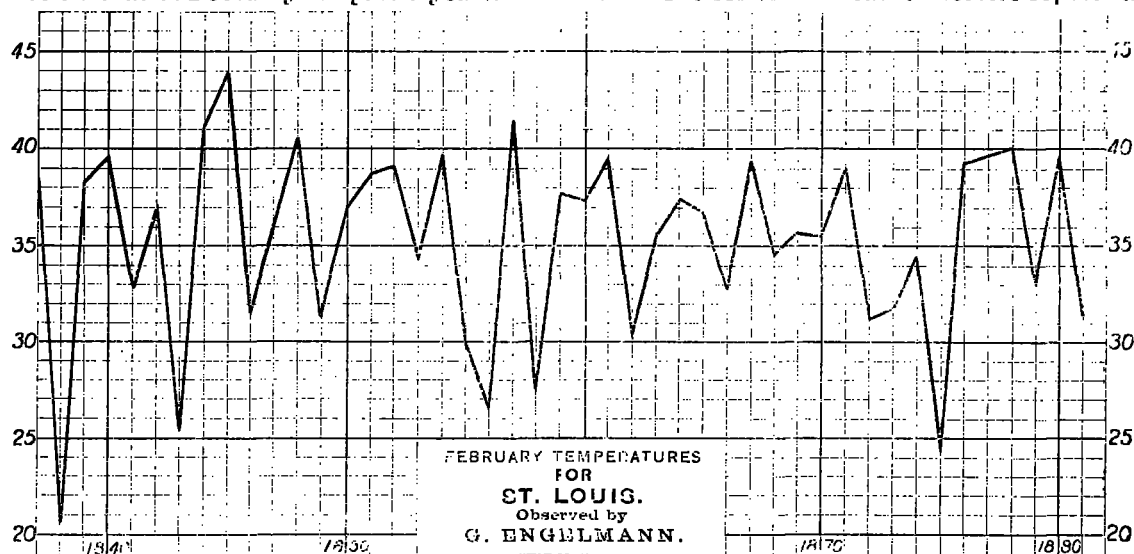


which, at York Factory, amounts to $17^{\circ}.4$ F. and an almost general though only slight fall over western Europe; elsewhere a general increase is found, which, over eastern Russia and at all the Siberian stations, exceeds 20° F.

TEMPERATURE OF THE AIR.

Temperature of the Air.—The mean temperature of the air for February, 1881, is shown by the isothermal lines (in red) on Chart No. II. The table of mean and comparative temperatures in the right-hand corner of the chart shows in the first column the average for the month throughout the various districts as reduced in the main from observations taken at Signal Service stations, and covering periods ranging from three to eighteen years. In the two remaining columns are shown the present monthly means and departures from such means during February, 1881. Throughout the whole country east of the 107th meridian, including the northern Rocky Mountain slope but excluding New England and the Florida peninsula, the temperature has been below the normal. In the two latter districts and in the Northern Plateau region it has experienced no change, while to the westward in the remaining districts the temperature has risen above the normal. The following large abnormal deviations may be noted: Ft. Bennett, $-14^{\circ}.7$; Omaha, $-9^{\circ}.7$; Dodge City, $-9^{\circ}.0$; Leavenworth, $-7^{\circ}.9$; Yankton, $-7^{\circ}.2$; North Platte, $-6^{\circ}.8$; Ft. Gibson, $-6^{\circ}.6$; Ft. Sill, $-6^{\circ}.2$; La Crosse, $-4^{\circ}.5$.

Deviations from Mean Temperatures.—Under this heading, departures exhibited by the reports from regular Signal Service stations are shown in the table of comparative temperatures on the right-hand side of chart No. II. The following items of importance, in connection with this topic, are reported from voluntary observers: *Illinois*: Belvidere, mean temperature $5^{\circ}.7$ below mean of February for past 14 years. Riley, mean temperature $5^{\circ}.3$ below mean of past 20 years; coldest February was in 1875; winter of 1880–81, $7^{\circ}.2$ colder than the mean of the winter seasons for the past 20 years; coldest winters, 1873 and 1875. *Iowa*: Clinton, mean temperature of month considerably below the normal. Logan, coldest in past 20 years. *Kansas*: Holton, coldest and roughest February ever experienced in the State. Lawrence, mean temperature $7^{\circ}.21$ below the mean of February for past 14 years; coldest February in 1875. *Maine*: Gardiner, mean temperature $0^{\circ}.15$ below that of February for past 45 years. *Maryland*: Sandy Springs, coldest in past 15 years. *Massachusetts*: Westborough, month unusually cold. Williamstown, month very cold. *Michigan*: Thornville, mean temperature 5° below that of February for past 10 years. Northport, month unusually cold, weather worst ever experienced. *Nebraska*: Howard, mean temperature 8° below that of February for past 5 years. *Missouri*: The Missouri Weather Service reports the



mean temperature of month considerably below the normal; coldest February in past 45 years occurred in 1838, mean temperature $20^{\circ}.8$; warmest, in 1845, $44^{\circ}.0$. The above diagram shows the curve of mean temperatures for February, as furnished by Prof. F. E. Nipher of the "Missouri Weather Service." As compared with the observations taken at the Signal Service stations in St. Louis during the past ten years, these curves appear to be reliable. *New Hampshire*: Grafton, month unusually cold and remarkable for rapid and extreme changes of temperature. Contoocookville, mean temperature about normal as compared with record of past 10 years. *New York*: North Volney, mean temperature, $2^{\circ}.2$ below that of past 12 years; coldest February in 1875, mean temperature $17^{\circ}.8$; warmest in 1880, mean $28^{\circ}.7$. Palermo, coldest February in past 28 years, except 1868, 1875, and 1879; 1880–81, coldest winter in past 28 years, mean, $11^{\circ}.7$; warmest in 1877–78, mean, $27^{\circ}.0$. *North Carolina*: Portsmouth, coldest in past 20 years. *Pennsylvania*: Dyberry, coldest in past 17 years.

The following are the maximum and minimum temperatures reported in each State and Territory:

Maximum Temperatures.—*Alabama*: 72° at Montgomery. *Arizona*: 90° at *Texas Hill and 89° at Yuma. *Arkansas*: 75° at *Mount Ida and 72° at Little Rock. *California*: 96° at *Mammoth Tank and 86° at Los Angeles. *Colorado*: 86° at *Pagosa Springs and 61° at Denver. *Connecticut*: 54° at New London. *Dakota*: 65° at Rapid City and 58° at Deadwood. *Delaware*: 64° at *Dover and 56° at Delaware Breakwater. *District of Columbia*: 64° at Washington. *Florida*: 84° at Key West and 82° at *Houston. *Georgia*: 75° at *Thomasville and 74° at Augusta. *Iowa*: 57° at Keokuk. *Idaho*: 61° at Lapwai. *Illinois*: 62° at *Anna and 60° at Springfield and Cairo. *Indiana*: 64° at *Laconia and 59° at Indianapolis. *Indian Territory*: 72° at Fort Sill. *Kansas*: 65° at Dodge City, *Wellington and *Yates Center. *Kentucky*: 67° at Louisville. *Louisiana*: 78° at New Orleans. *Maine*: 50° at Portland and *Surry. *Maryland*: 64° at Baltimore. *Massachusetts*: 60° at *Westborough and 55° at Boston. *Michigan*: 54° at Detroit and *Marshall. *Minnesota*: 39° at *New Ulm and 34° at Duluth. *Mississippi*: 74° at *Fayette and 72° at Vicksburg. *Missouri*: 68° at *Pierce City and *New Springfield and 65° at St. Louis. *Montana*: 65° at Fort Custer and Rock Creek. *Nebraska*: 57° at *Camp Sheridan and 55° at North Platte. *Nevada*: 67° at Winnemucca. *New Hampshire*: 52° at *Auburn and 36° on summit of Mount Washington. *New Jersey*: 60° at *Atco, *South Orange and *Trenton, and 51° at Cape May and Atlantic City. *New Mexico*: 81° at La Mesilla. *New York*: 57° at New York City and Rochester. *North Carolina*: 72° at *Weldon and 71° at Wilmington. *Ohio*: 67° at Cincinnati. *Oregon*: 83° at *Eola and 63° at Portland. *Pennsylvania*: 63° at Pittsburgh. *Rhode Island*: 50° at Newport. *South Carolina*: 73° at *Aiken and 71° at Charleston. *Tennessee*: 69° at Memphis, Knoxville and Chattanooga. *Texas*: 87° at Rio Grande. *Utah*: 63° at Salt Lake City. *Vermont*: 50° at *Charlotte and 49° at Burlington. *Virginia*: 71° at Cape Henry and 70° at *Johnsontown. *Washington Territory*: 64° at Dayton. *West Virginia*: 63° at Morgantown. *Wisconsin*: 46° at *Edgerton and 44° at Madison. *Wyoming Territory*: 59° at Cheyenne.

Those marked with a star (*) are reported by U. S. Army Post Surgeons or Voluntary Observers.

Minimum Temperatures.—*Alabama*: 23° at *Auburn and 30° at Mobile and Montgomery. *Arizona*: 10° at Prescott. *Arkansas*: 4° at *Fayetteville and 22° at Little Rock. *California*: 12° at *Ciso and 22° at Campo. *Colorado*: —30° at *Pagosa Springs and —25° on summit of Pikes' Peak. *Connecticut*: —7° at *Southington and —4° at New Haven. *Dakota*: —34° at Ft. Bennett. *Delaware*: 0° at *Dover and 7° at Delaware Breakwater. *District of Columbia*: 2° at Washington. *Florida*: 30° at *Houston and 31° at Pensacola. *Georgia*: 21° at Atlanta. *Iowa*: —24° at *Vail and —9° at Dubuque. *Idaho*: 6° at Lapwai. *Illinois*: —16° at *Elmira and *Belvidere and 4° at Champaign. *Indiana*: —14° at *Wabash and 1° at Indianapolis. *Indian Territory*: —8° at Ft. Supply. *Kansas*: —24° at *Clay Center and —10° at Dodge City. *Kentucky*: 6° at Louisville. *Louisiana*: 22° at Shreveport. *Maine*: —18° at *Orono and —6° at Portland. *Maryland*: —10° at *Deer Park and 4° at Baltimore. *Massachusetts*: —13° at *Williamstown and —5° at Boston. *Michigan*: —27° at Alpena. *Minnesota*: —33° at Moorhead. *Mississippi*: 28° at *Fayette and Vicksburg. *Missouri*: —16° at *Corning and 5° at St. Louis. *Montana*: —29° at Ft. Custer. *Nebraska*: —29° at *Camp Sheridan and —23° at North Platte. *Nevada*: 0° at *Toano and 13° at Pioche. *New Hampshire*: —36° on summit of Mt. Washington and —12° at *Grafton. *New Jersey*: —6° at *Vineland, *Atco and *Freehold and —4° at Atlantic City and Barnegat. *New Mexico*: —21° at *Ft. Union and —2° at Santa Fe. *New York*: —34° at *Schroon Lake and —7° at Buffalo and Albany. *North Carolina*: 7° at *Highlands and 11° at Kittyhawk. *Ohio*: —12° at *Westerville and —3° at Cleveland. *Oregon*: 25° at Umatilla. *Pennsylvania*: —19° at *Catawissa and —4° at Pittsburgh. *Rhode Island*: —2° at Newport. *South Carolina*: 21° at *Aiken and 26° at Charleston. *Tennessee*: 18° at Knoxville, *Ashwood and *Clarksville. *Texas*: 9° at Stockton. *Utah*: —3° at *Terrace and 16° at Salt Lake City. *Vermont*: —22° at Woodstock and —18° at Burlington. *Virginia*: —1° at *Wytheville and 5° at Chincoteague. *Washington Territory*: —7° at Spokane. *West Virginia*: —2° at Morgantown. *Wisconsin*: —24° at *Neilsville and —16° at La Crosse. *Wyoming Territory*: —31° at *Wash-akee and —12° at Cheyenne.

Those marked with a star (*) are reported by U. S. Army Post Surgeons or Voluntary Observers.

Ranges of Temperature at Signal Service Stations.—*Monthly ranges* in general varied from 50° to 75° over the country east of the Rocky Mountains. Ranges less than 50° occurred in the following regions: eastern Maine, South Atlantic States, Tennessee, in the Gulf States westward to the Mississippi, in southern Wisconsin and northern Illinois, in southwestern New Mexico and southeastern Arizona, in northern Utah and Nevada and throughout the Pacific coast regions. The smallest ranges were: San Francisco, 24°; Key West, 25°; Sacramento, 27°; Punta Rassa, 36°; Olympia, 34°; Galveston, 36°; Portland, Or., Umatilla and Visalia, Cal., 37°; Red Bluff, 38°; Cedar Keys, 39°; Pensacola, 40°. The largest were: Rapid City, Dak., 95°; Ft. Custer, 94°; Helena and Rock Creek, Mont., 85°; Denver and Ft. Benton, 81°; North Platte and Deadwood, 78°; Ft. Shaw and Ft. Bennett, 77°; Yankton and Dodge City, 75°. The *daily ranges* varied in the different districts as follows: New England, from 21° at Eastport to 37° at Burlington; Middle States, 19° at Cape May to 37° at Fort Myer; South Atlantic States, 24°

at Fort Macon to 33° at Kittyhawk; Eastern Gulf States, 14° at Key West to 27° at Montgomery; Western Gulf States, 19° at Galveston to 33° at Little Rock; Ohio valley and Tennessee, 26° at Indianapolis to 37° at Morgantown and Pittsburg; Lower Lake region, 32° at Oswego to 39° at Toledo; Upper Lake region, 26° at Milwaukee and Chicago to 36° at Alpena and Port Huron; Upper Mississippi valley, 25° at Champaign and 28° at St. Paul to 38° at Keokuk; Missouri valley, 27° at Omaha to 40° at Ft. Buford; Red River of the North Valley, 35° at Moorehead to 37° at St. Vincent; Texas, 31° at Laredo to 55° at Stockton and 62° at El Paso; Eastern Rocky Mountain Slope, 34° at Ft. Gibson to 42° at Deadwood; Rocky Mountain, 25° on summit of Pike's Peak to 30° at Ft. Missoula and 41° at Cheyenne; Southern Plateau, 35° at Yuma to 49° at Prescott; Middle Plateau, 25° at Salt Lake City to 39° at Winnemucca; Southern Pacific coast region, 15° at San Francisco and 19° at Sacramento to 49° at Campo; Middle Pacific coast region, 15° at San Francisco to 33° at Red Bluff; North Pacific coast region, 23° at Lewiston and Olympia to 26° at Roseburg.

F. *Frost*—was reported on nearly every day throughout the month from stations north of the 36th parallel and east of the 114th meridian. Beyond these boundaries to the south and west it occurred in the various states on the following dates: North Carolina, 2nd to 8th, 11th, 13th to 18th, 20th to 24th; South Carolina, 12th to 15th; Georgia, 3rd to 5th, 13th to 15th, 22nd, 23rd; Florida, north of the 28th parallel, 3rd, 4th, 5th, 13th, 14th, 15th; Alabama, 3rd, 14th, 15th, 16th, 22nd; Mississippi, 3rd, 12th to 15th, 20th, 21st, 22nd, 28th; Louisiana, 2nd, 13th, 14th, 15th, 21st, 22nd; Arkansas, 2nd, 3rd, 13th, 14th, 15th, 20th, 21st; Texas, 1st to 3rd, 5th to 8th, 10th to 16th, 18th to 23rd; southern New Mexico, 1st, 4th, 6th, 11th, 12th, 13th, 15th, 16th, 18th to 23rd; southern Arizona, 1st to 3rd, 5th, 6th, 7th, 10th, 12th to 28th; California, (southern portion,) 6th, 7th, 10th to 15th, 19th, 20th, 21st, 24th, 25th, (northern portion,) 9th, 10th, 11th, 18th; Oregon, 6th, 7th, 8th, 12th, 13th, 14th, 16th, 17th, 18th; Washington Territory, along coast, 14th, 17th, 18th.

Ice—in the northern sections of the country is more properly exhibited elsewhere in the REVIEW under the head of "*Ice in Rivers and Harbors.*" Along the southern boundary of the country ice was reported from the following stations: Campo, Cal., 10th, 11th; Eagle Pass, Tex., 12th, 13th; Melissa, Tex., 11th, 12th; Indianola, 13th; Fayette, Miss., 13th, 14th, 15th; Mobile, 14th; Montgomery, 13th.

PRECIPITATION.

The general distribution of rain fall (including melted snow) for February, 1881, is shown on Chart No. III, from the reports of over 500 stations. From the table in the left-hand corner of the chart is obtained a monthly average for each of the various districts, determined from the records (covering a period of several years) of Signal Service stations, and also a comparison of the present month with such averages. The regions of greatest rain-fall are to be found along the Pacific coast north of parallel 40°, in northern Texas, northern Illinois, in the Western Gulf States and western North Carolina. The region of no precipitation, covering a territory of about 200 miles square, embraces a portion of southeastern California and southwestern Arizona. As compared with the mean of past years the rain-fall for the month is in general considerably above the average. The most marked departures occurred in the Middle and Northern Pacific Coast regions, Lower Missouri valley, Upper Lake region, Middle Atlantic States and in the central portion of the Western Gulf States. Departures of excess at particular stations were most marked in these districts. In southern Florida, southern Dakota and along the California coast south of parallel 40°, individual deficiencies were quite prominent. The rain-fall of the Rocky Mountain and Plateau districts, nearly always comparatively low, was quite evenly distributed, except in a narrow region extending northward from Salt Lake City.

In connection herewith the following notes from voluntary observers may be of interest. Riley, Ill., monthly rain-fall 4.05 inches above the average of February for the past 18 years and 1.77 inches greater than the largest amount ever recorded in February during the past 20 years. Lawrence, Kan., monthly rain-fall 2.37 inches above the mean of the past 14 years and much the largest of any February in that period. Gardiner, Me., monthly rain-fall 2.55 inches above the mean of the past 45 years; smallest in that period, 1.11 inches in 1844, largest 9.47 inches in 1853. The Missouri State Weather Service, Prof. F. E. Nipher, reports that the rain-fall has been quite uniform over the State, being on the average about four inches. This amount has been exceeded at the St. Louis station five times since 1839. North Volney, N. Y., monthly rain-fall 0.69 inches above the mean of the past eight years.

Special Heavy Rains.—1st, Galveston, 3.62 inches. 1st and 2nd, Albany, Or., 4.96; Portland, Or., 4.11; Neah Bay, Wash. Ty., 4.93; Ft. Stevens, Or., 3.30; Olympia, 3.74. 2nd and 3rd, Mt. St. Helena, Cal., 4.37; Ft. Gaston, 6.41. 3rd and 4th, Yosemite valley, Cal., 3.31. 4th, Eagle Rock, Mont., 1.98. 5th, Melissa, Tex., 5.00. 5th and 6th, Pilot Point, Tex., 2.51; Clarksville, Tex., 2.50; Logan, Ga., 4.00; Fayette, Miss., 3.00; Ft. Leavenworth, Kan., 3.10. 6th, Ft. Barancas, Fla., 6.93. 6th and 7th, Mt. Ida, Ark., 3.20; Independence, Kan., 3.90. 7th, Mobile,